



## *Just the Facts...*      *Handling of Human Remains from Natural Disasters*

**1. BACKGROUND.** Natural disasters usually lead to fatalities due to trauma. Human remains resulting from these types of disasters generally pose little health risk because cellular and pathogenic organisms begin to die soon after death. As cellular death occurs, post-mortem cooling of the body occurs. During this process, known as algor mortis, the remains begin to decompose (the internal and external environment of the remains will determine their speed of decomposition). As the remains decompose, bloodborne pathogens and other potentially infectious materials (e.g. gastrointestinal and respiratory pathogens) may continue to persist. Personnel in direct contact with human remains must take precautions to protect themselves from chronic infectious hazards, including hepatitis B virus, hepatitis C virus, human immunodeficiency virus (HIV), enteric pathogens, and *Mycobacterium tuberculosis*.

**2. POTENTIAL HEALTH HAZARDS.** Blood and body fluids, feces, and gastrointestinal toxins pose the most concern for personnel in direct contact with human remains (gastrointestinal organisms do not survive long in an aerobic environment and present little risk when the remains have been decaying for sometime or have been in the water). Exposures on intact skin pose little risk. Transmission is relatively inefficient for diseases, requiring percutaneous exposure (from a needle stick or exposure from a sharp penetrating object); direct contact with mucous membranes (such as eyes, nose, or mouth); or direct contact with non-intact skin (abraded, chapped, inflamed, or with visible wounds or traumas). Exposure occurs through direct contact with the victim's remains and soiled clothes, and transmission can occur via the fecal-oral route. Contamination of equipment used to transport the remains may also pose a hazard.

**Water Supply Contamination.** Human remains in contact with local potable water systems have rarely been associated with transmission of bacterial or viral gastrointestinal diseases. Water supplies in affected regions are much more likely to be contaminated due to extensive damage to sanitation systems.

**3. PROTECTIVE EQUIPMENT AND OTHER PRECAUTIONS.** Use of personal protective equipment (PPE) and universal/standard precautions by personnel handling human remains can greatly reduce the risk of exposure to infectious agents. Personnel handling human remains should treat all body fluids as if they are potentially infectious and use respiratory protection to guard against gastrointestinal toxins and other aerosolized agents.

**Gloves.** When handling human remains, workers should wear gloves (fluid proof – polyvinyl chloride (PVC), vinyl, rubber, latex), especially if the bodies are badly damaged. Wear structural fire-fighting gloves that meet the requirements of 29 CFR 1910.156, *Fire Brigades*, for situations where broken glass and sharp edges may be encountered, such as when extricating remains from wreckage. Select gloves that fit tightly around the wrists to prevent contamination of the hands for situations where large amounts of blood are likely to be encountered. Alternatively, double gloving with a waterproof glove under a heavy work glove will protect the hands from both cuts and scrapes and exposure to fluids and/or floodwater. Personnel should also practice good personal hygiene after handling remains.

**Masks and Eyewear.** Other PPE, such as surgical masks and eyewear, are only required where large quantities or splashes of blood are anticipated and are probably not necessary when handling bodies following a natural disaster. The use of a face mask is rarely considered to be necessary. Since masks limit ventilation and the workers tire more easily, using them can slow down the tasks of moving, storing, and preparing corpses. Generally, there is no danger of contamination through the respiratory tract since there is no respiratory function in dead bodies and they do not present a danger for those handling them. Gases and strong odors are the most unsettling aspect, and when necessary, covering the nose and mouth is sufficient.

**Outer Clothing.** Disposable clothing is available and is recommended for many situations. In other cases, traditional fabrics are preferable owing to their strength especially when lifting remains. Gowns or aprons should be worn during procedures that are likely to generate splashes of blood or other body fluids. Closed, boot-style shoes are also recommended in these instances. Wear rubber boots or appropriate shoe covers where there is potential for footwear to become grossly contaminated. Rain gear is also useful in case of storms.

**Human Remains Pouches.** Human remains pouches will further reduce the risk of infection and are useful for the transport of human remains that have been badly damaged. Place pouches containing human remains in a cool or refrigerated location to keep the remains cool and to slow decomposition.

**Washing/Cleansing.** After handling remains, wash hands with soap and clean, potable water. Always do this before smoking and before eating.



Vaccinations. Hepatitis B vaccination will help prevent infection and will be 70% to 80% effective within one week of exposure. Those with a prior bacille Calmette-Guérin (BCG) vaccination may have some protection against tuberculosis, and tuberculin testing may be an appropriate follow-up measure. A Tetanus booster is highly recommended.

4. DISPOSAL OF PPE. Remove used gloves and place them in a bag designated for disposal of PPE. (In some States, these items are classified as regulated medical waste. Check your local regulations for appropriate guidelines.) Where non-disposable gloves or PPE are used, place them in a separate bag for appropriate treatment (e.g. steam sterilization, chemical disinfection) to render them non-infectious. Clean, disinfect, and dry all reusable items between uses. To avoid cross-contamination, do not use personal items, such as pens or combs, while wearing soiled gloves. Change out gloves as often as necessary to minimize the risk of contaminating personal items. Make gloves readily available during the removal and processing of human remains so that personnel can quickly and easily replace soiled gloves.

5. DISINFECTING EQUIPMENT. Carefully wash all equipment, including clothes, stretchers, and vehicles used in the handling of remains with an EPA-approved disinfectant after use or before reuse. Place contaminated reusable PPE and clothing into leak-resistant bags or containers immediately upon removing the articles. Never wash contaminated PPE and clothing with personal laundry. Wash and dry reusable PPE and clothing according to the instructions on their labels, in hot water at least 160°F and detergent for 25 minutes, or with chemicals at the proper concentration for low temperature washing. Use an EPA-approved disinfectant to decontaminate reusable gloves, protective eyewear, face shields, and similar PPE. Follow the manufacturer's recommendations for disinfectant concentrations and contact times. Brush scrub contaminated boots and leather goods with soap and hot water. Place contaminated disposable PPE and clothing that is saturated, dripping, or caked with dried blood into a regulated medical waste container for appropriate disposal.

6. PERSONAL EFFECTS (PE). Leave personal effects on the remains. (Alternatively, place all items in a plastic bag and secure them to the remains.) Mortuary affairs personnel should use the appropriate forms to inventory personal effects. Safeguarding personal effects for final processing is just as critical as safely and carefully handling the human remains. Follow local regulatory guidance to ensure blood-soaked or soiled PE are appropriately treated, disinfected and processed along with the remains.

7. SAPONIFICATION. Human remains found in water or moist soil readily undergo saponification (the hydrolysis of fat and other soft tissues into adipocere, or mortuary wax). This occurs when the amount of fatty tissue is high, the surrounding environment is alkali, and there is an absence or minimal presences of agents of decomposition. Under these conditions, personnel handling remains must wear PPE and be extremely careful when handling remains as skin slippage may occur.

8. TRAINING. The Occupational Safety and Health Administration (OSHA) establishes personal protective and training guidelines in 29 CFR 1910.1030. Under this regulation, mortuary affairs personnel handling human remains must receive bloodborne pathogen training within 90 days of employment. This training should include appropriate precautions for these persons, use of personal protective gear (e.g. gloves, Tyvek-type suits, and respirators), use of human remains pouches, and vaccinations for hepatitis B and tuberculosis.

9. REFERENCES. Technical and consultative assistance may be requested from on-site morgue and/or mortuary affairs teams that may be assigned to the area of the natural disaster. The following references were reviewed and incorporated into this fact sheet, and may prove useful for further review.

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